1. A method of providing load control for an exercise apparatus, the apparatus comprising an exercise bar, a means for measuring the displacement over time of the exercise bar, horizontal and vertical actuators connected to move the exercise bar, a computer for generating horizontal and vertical actuator signals operatively connected to the means for measuring the displacement of the horizontal and vertical actuators and the computer; the method comprising:

programming the computer to generate actuator signals for a predetermined exercise activity;

generating displacement signals from the means for measuring the displacement over time of the exercise bar;

transmitting the displacement signals to the computer;

calculating, in the computer, the speed and acceleration of the exercise bar;

calculating, in the computer, one or more actuator signals sufficient to maintain the speed, displacement, or force parameters for the predetermined exercise activity; and,

transmitting the actuator signal to the actuators, so that the actuators move the exercise bar according to the predetermined exercise activity.

2. The method of claim 1 where the step of calculating, in the computer, one or more actuator signals sufficient to maintain the speed, displacement, or force parameters for the predetermined exercise activity, further comprises calculating a force parameter that varies linearly as a function of the displacement of the exercise bar.

3. The method of claim 1 where the step of calculating, in the computer, one or more actuator signals sufficient to maintain the speed, displacement, or force parameters for the predetermined exercise activity, further comprises calculating a force parameter that varies non-linearly as a function of the displacement of the exercise bar.

4. The method of claim 1 where the step of calculating, in the computer, one or more actuator signals sufficient to maintain the speed, displacement, or force parameters for the predetermined exercise activity, further comprises calculating a force parameter that varies as a function of the speed of the exercise bar.

5. The method of claim 1 where the step of calculating, in the computer, one or more actuator signals sufficient to maintain the speed, displacement, or force parameters for the predetermined exercise activity, further comprises calculating a force parameter that varies as a function of time.

6. The method of claim 1 further comprising the step of recording the values of calculated and actual parameters of speed, displacement or force for a particular exercise.

7. The method of claim 1, further including a safety routine, the safety routine comprising the steps of:

checking for the presence of an external force acting on the exercise bar; and, if no external force exists, checking to see if the displacement of the exercise bar is falling, and if so;

computing an actuator signal to increase the displacement of the exercise bar.

8. A method of providing load control for an exercise apparatus, the apparatus comprising an exercise bar, a means for measuring the displacement over time of the exercise bar, horizontal and vertical actuators connected to move the exercise bar, a computer for generating horizontal and vertical actuator signals operatively connected to the means for measuring the displacement of the horizontal and vertical actuators and the computer; and counter-force valves connected across at least one of the horizontal and vertical actuators; the method comprising:

programming the computer to generate actuator signals for a predetermined exercise activity;

generating displacement signals from the means for measuring the displacement over time of the exercise bar;

transmitting the displacement signals to the coomputer;

calculating, in the computer, the speed and acceleration of the exercise bar;

calculating, in the computer, one or more actuator signals sufficient to maintain the speed, displacement, or force parameters for the predetermined exercise activity; and,

transmitting the actuator signal to the counter-force valves, so that the actuators are commanded to move the exercise bar according to the predetermined exercise activity.

9. The method of claim 8 where the step of calculating, in the computer, one or more actuator signals sufficient to maintain the speed, displacement, or force parameters for the predetermined exercise activity, further comprises calculating a force parameter that varies linearly as a function of the displacement of the exercise bar.

10. The method of claim 8 where the step of calculating, in the computer, one or more actuator signals sufficient to maintain the speed, displacement, or force parameters for the predetermined exercise activity, further comprises calculating a force parameter that varies non-linearly as a function of the displacement of the exercise bar.

11. The method of claim 8 where the step of calculating, in the computer, one or more actuator signals sufficient to maintain the speed, displacement, or force parameters for the predetermined exercise activity, further comprises calculating a force parameter that varies as a function of the speed of the exercise bar.

12. The method of claim 8 where the step of calculating, in the computer, one or more actuator signals sufficient to maintain the speed, displacement, or force parameters for the predetermined exercise activity, further comprises calculating a force parameter that varies as a function of time.

13. The method of claim 8 further comprising the step of recording the values of calculated and actual parameters of speed, displacement or force for a particular exercise.

14. The method of claim 8, further including a safety routine, the safety routine comprising the steps of:

checking for the presence of an external force acting on the exercise bar; and, if no external force exists,

checking to see if the displacement of the exercise bar is falling, and if so;

computing an actuator signal to increase the displacement of the exercise bar.

15. A method of providing load control for an exercise apparatus, the apparatus comprising an exercise bar moveably connected between congruent pantograph trusses, a means for measuring the displacement over time of the exercise bar, horizontal and vertical actuators connected to move the exercise bar, a computer for generating horizontal and vertical actuator signals operatively connected to the means for measuring the displacement of the horizontal and vertical actuators and the computer; the method comprising:

programming the computer to generate actuator signals for a predetermined exercise activity;

generating displacement signals from the means for measuring the displacement over time of the exercise bar;

transmitting the displacement signals to the computer;

calculating, in the computer, the speed and acceleration of the exercise bar;

calculating, in the computer, one or more actuator signals sufficient to maintain the speed, displacement, or force parameters for the predetermined exercise activity; and, transmitting the actuator signal to the actuators, so that the actuators move the exercise bar according to the predetermined exercise activity.

16. The method of claim 15 where the step of calculating, in the computer, one or more actuator signals sufficient to maintain the speed, displacement, or force parameters for the predetermined exercise activity, further comprises calculating a force parameter that varies linearly as a function of the displacement of the exercise bar.

17. The method of claim 15 where the step of calculating, in the computer, one or more actuator signals sufficient to maintain the speed, displacement, or force parameters for the predetermined exercise activity, further comprises calculating a force parameter that varies non-linearly as a function of the displacement of the exercise bar.

18. The method of claim 15 where the step of calculating, in the computer, one or more actuator signals sufficient to maintain the speed, displacement, or force parameters for the predetermined exercise activity, further comprises calculating a force parameter that varies as a function of the speed of the exercise bar.

19. The method of claim 15 where the step of calculating, in the computer, one or more actuator signals sufficient to maintain the speed, displacement, or force parameters for the predetermined exercise activity, further comprises calculating a force parameter that varies as a function of time.

20. The method of claim 15 further comprising the step of recording the values of calculated and actual parameters of speed, displacement or force for a particular exercise.

21. The method of claim 15, further including a safety routine, the safety routine comprising the steps of:

checking for the presence of an external force acting on the exercise bar; and, if no external force exists,

checking to see if the displacement of the exercise bar is falling, and if so;

computing an actuator signal to increase the displacement of the exercise bar.